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04/28/00 jc520 U.S. PTO

NEW, CONTINUATION, DIVISIONAL OR CONTINUATION-IN-PART APPLICATION UNDER 37 C.F.R. §1.53(b)

Attorney Docket No. 8409-000030
Express Mail Label No. EJ881514040US
Date April 28, 2000

jc511 U.S. PTO 09/560341 04/28/00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Hon. Commissioner of Patents and Trademarks
Washington, D. C. 20231

Sir:

Transmitted herewith for filing under 37 C.F.R §1.53(b) is a patent application for **Isolation Mount**

identified by: [ ] First named inventor ____________
or [X] Attorney Docket No. (see above)

1. **Type of Application**

[X] This application is a new (non-continuing) application.

[ ] This application is a [ ] continuation / [ ] divisional / [ ] continuation-in-part of prior application No. _____. Amend the specification by inserting before the first line the sentence:

--This is a [continuation/division/continuation-in-part] of United States patent application No. _____, filed _____.--

[ ] The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied, is considered part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

If for some reason applicant has not requested a sufficient extension of time in the parent application, and/or has not paid a sufficient fee for any necessary response in the parent application and/or for the extension of time necessary to prevent the abandonment of the parent application prior to the filing of this application, please consider this as a Request for an Extension for the required time period and/or authorization to charge our Deposit Account No. 08-0750 for any fee that may be due. THIS FORM IS BEING FILED IN TRIPLICATE: one copy for this application; one copy for use in connection with the Deposit Account (if applicable); and one copy for the above-mentioned parent application (if any extension of time is necessary).

2. **Contents of Application**

a. Specification of 17 pages;
   [ ] A microfiche computer program (Appendix);
   [ ] A nucleotide and/or amino acid sequence submission;

[ ] Because the enclosed application is in a non-English language, a verified English translation [ ] is enclosed [ ] will be filed.

[ ] Cancel original claims _____ of the prior application before calculating the filing fee. (At least one original independent claim must be retained for filing date purposes.)

b. [X] Drawings on 3 sheets;

c. [X] A signed Oath/Declaration [X] is enclosed / [ ] will be filed in accordance with 37 C.F.R. §1.53(f).

The enclosed Oath/Declaration is [X] newly executed / [ ] a copy from a prior application under 37 C.F.R. §1.63(d) / [ ] accompanied by a statement requesting the deletion of person(s) not inventors in the continuing application.

d. **Fees**

FILING FEE CALCULATION	Number Filed				Number Extra		Rate		Basic Fee $690.00
Total Claims	20	–	20	=	0	×	$18.00	=	0.00
Independent Claims	2	–	3	=	0	×	$78.00	=	0.00
Multiple Dependent Claim(s) Used							$260.00	=	
FILING FEE – NON-SMALL ENTITY									690.00
FILING FEE - SMALL ENTITY: Reduction by 1/2 [ ] Verified Statement under 37 C.F.R. §1.27 is enclosed. [ ] Verified Statement filed in prior application.									
Assignment Recordal Fee ($40.00)									40.00
37 C.F.R. §1.17(k) Fee (non-English application)									
TOTAL...........................									**$730.00**

[X] A check is enclosed to cover the calculated fees. The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment, to Deposit Account No. 08-0750. A duplicate copy of this document is enclosed.

[ ] The calculated fees will be paid within the time allotted for completion of the filing requirements.

[ ] The calculated fees are to be charged to Deposit Account No. 08-0750. The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment, to said Deposit Account. A duplicate copy of this document is enclosed.

3. **Priority Information**

[ ] **Foreign Priority**: Priority based on ______ Application No. _______, filed ______, is claimed.

[ ] A copy of the above referenced priority document [ ] is enclosed / [ ] will be filed in due course, pursuant to 35 U.S.C. §119(a)-(d).

[ ] **Provisional Application Priority**: Priority based on United States Provisional Application No. ________________________, filed _______________, is claimed under 35 U.S.C. §119(e).

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4. **Other Submissions**

[ ] A Preliminary Amendment is enclosed.

[ ] An Information Disclosure Statement, sheet of PTO Form 1449, and patent(s)/publications/documents are enclosed.

[X] A power of attorney

[X] is submitted [X] with the new Oath/Declaration.

[ ] is of record in the prior application and [ ] is in the original papers / [ ] a copy is enclosed.

[X] An Assignment of the invention

[X] is enclosed with separate cover sheets pursuant to 37 C.F.R. §§3.11, 3.28 and 3.31.

[ ] is of record in a prior application. The assignment is to _____, and is recorded at Reel _____, Frame(s) _____.

[ ] An Establishment of Assignee's Right To Prosecute Application Under 37 C.F.R. §3.73(b), and Power Of Attorney is enclosed.

[X] An Express Mailing Certificate is enclosed.

[X] Other: postcard

Attention is directed to the fact that the correspondence address for this application is:

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Respectfully,

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Washington, DC 20231

EXPRESS MAILING CERTIFICATE

Applicant: Tousi et al.

Serial No. (if any):

For: Isolation Mount

Docket: 8409-000030

Attorney: Casimir R. Kiczek

"Express Mail" Mailing Label Number EJ881514040US

Date of Deposit .... April 28, 2000

I hereby certify and verify that the accompanying **Transmittal letter (in triplicate), a check in the amount of $730.00, Patent Application (17 pages), Declaration and Power of Attorney, 3 sheets of drawings, Assignment with cover sheet, and a postcard** are being deposited with the United States Postal Service "Express Mail Post Office To Addressee" service under 37 C.F.R. 1.10 on the date indicated above and are addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Signature of Person Mailing Document(s)

PATENT
8409-000030

ISOLATION MOUNT

BACKGROUND OF THE INVENTION

The present invention relates to an isolation mount used in securing a vehicle body to a support structure, such as a vehicle cradle mount or subframe, and for absorbing vibrations and movements between the two structures.

Subframe mounts are used extensively in unibody vehicles to isolate the vibration which is transmitted from the engine to the subframe and the body. The subframe mount also improves vehicle dynamics by providing vertical stiffness, lateral stiffness and fore and aft stiffness and their respective stiffness rates. The operator of the vehicle perceives that vibration isolation relates to ride quality and that improved vehicle dynamics translates into improved handling performance.

Typically, there are as many as four locations on the subframe where an isolation mount is utilized. The subframe is sandwiched between the upper portion and the lower portion of the vibration mount and the vehicle body rests on top of the upper mount. A bolt extends through an aperture in the frame and the isolation mount. The lower mount and then the upper mount are connected by a cage nut on the body to complete the attachment of the body to the subframe. The mount isolates engine or transmission induced vibration that is transmitted along the subframe to the body. The mount also improves vehicle dynamics by controlling or attenuating relative movement between the vehicle body and subframe in the vertical mode or plane, that is up and down, relative movement, and also to control lateral mode or plane, that is side to side movement, and fore and aft mode or plane, that is front to back relative movement.

A typical design of a subframe isolation mount employs a relatively hard or high durometer rubber (typically 40 to 80 Shore A) as an isolating material. High durometer rubber for cradle or subframe mounts is an excellent material for improved handling in the lateral plane, especially when it is combined with rate plates to stiffen the response in the lateral plane and to a limited degree the fore and aft plane. However, since the solid elastomeric material is generally very stiff, it does not control or attenuate vertical forces from the subframe to the body very effectively. As a result, the isolation mount has a high lateral stiffness rate response which is desirable but it has a fore and aft stiffness rate response which is marginally acceptable and a vertical stiffness rate response which is low. Therefore, good ride and handling of a vehicle are compromised because of the stiffness properties of the solid elastomeric material.

Thus, there is a need for a vibration isolation mount that provides for ride quality that is satisfactory to the operator without sacrificing the handling characteristics of the vehicle in the lateral plane, fore and aft plane and vertical plane. Additionally, there is a need for a mount that is lighter in weight, improves durability and reduces both initial and high mileage noise, vibration, and harshness between a subframe and a body.

SUMMARY OF THE INVENTION

The present invention discloses an isolation mount for motor vehicles having a subframe or cradle and a body. The body has an aperture and the subframe has a through hole. The isolation mount includes a foamed elastomeric annular upper isolation member between the body and the subframe. The foamed elastomeric insert member is disposed in the annular upper member and extends therefrom. The

insert member has an elliptical inner axial passageway. An elliptical isolation member extends from the upper isolation member and is contiguous to the elliptical inner axial passageway of the insert member. The elliptical isolation member has a cross sectional area and a passageway. The cross sectional area has a major axis and a minor axis. The major axis provides control or attenuation for lateral vibration and the minor axis provides control or attenuation for fore and aft vibration. An elliptical retainer member is disposed in the passageway. The retainer has a bore. The annular lower isolation member is mounted to the opposite subframe opposite the annular upper isolation member. The annular lower isolation member and the annular upper isolation member provide control or attenuation for vertical vibration. Thus, a simpler, more cost effective isolation mount is provided which improves vehicle dynamics between the body and the subframe in the vertical direction, lateral direction and fore and aft directions.

It is an object of the present invention to provide a foamed elastomeric isolation mount with an elliptical insert which attenuates the vibration transmitted from the subframe to the body as well as providing improved vertical mode, lateral mode, and fore and aft mode stiffness for improved vehicle dynamics.

It is another object of the present invention to provide an isolation mount with an elliptical insert which utilizes foamed elastomeric upper and lower mounts which isolate vibration transmitted from the subframe to the body, as well as providing low vertical stiffness, high lateral stiffness and moderate fore and aft stiffness to improve handling performance of the vehicle.

These and other features of the present invention will become apparent from the subsequent descriptions and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The various advantages of the present invention will become apparent to one skilled in the art upon reading the following specification and by reference to the drawings which include:

Figure 1 is the desired relationship of vehicle load and displacement on the isolation mount in the lateral mode, fore and aft mode and vertical mode;

Figure 2 is an exploded view of the isolation mount oriented for assembly to a vehicle according to the invention;

Figure 3 is a vertical sectional exploded view of the isolation mount according to the invention;

Figure 4 is a vertical sectional view of the assembled isolation mount; and

Figure 5 is a top sectional view along 5-5 in Figure 4; and

Figure 6 is a vertical sectional view of the upper mount shown in Figure 4 rotated 90 degrees.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As used herein, fore and aft mode shake means front to back movement or displacement which is along the longitudinal axis of the vehicle and transverse of the axis of a mount and is identified by the letters F & A in Figure 3. Vertical mode shake means up and down movement or displacement which is along the axial axis of a mount and identified by the letter V in Figures 4 and 6. Lateral mode shake means side to side movement or displacement that is transverse of the longitudinal axis of the vehicle and is perpendicular to the fore and aft mode shake and identified by the letter L in Figure 6. Lateral shake stiffness is the displacement of a mount in the lateral mode shake direction divided by unit load. Vertical mode shake stiffness

is the displacement of a mount in the vertical mode shake direction divided by unit load. Fore and aft shake stiffness is the displacement of a mount in the fore and aft mode shake direction divided by unit load. The desired lateral mode, fore and aft mode and vertical mode load versus displacement relationship for a vehicle is shown in Figure 1.

An isolation mount according to the present invention is designated by the numeral 100 as shown in Figures 2-6. The mount 100 includes an elastomeric upper mount 10, an elastomeric lower mount 60 and a threaded fastener member 70.

The upper mount 10 has a thimble member 26 with a flange portion 27 and an axially extending tubular portion 28. The mount 10 has a foamed elastomeric annular portion 14 which preferably has a top portion 14 with an inner diameter 16 and an outer diameter 18. The top portion has an axial length 15. Alternatively, the outer peripheral surface of the annular portion 14 may take any shape that can be used in the application, such as square, rectangular, polygonal, conical, triangular, elliptical or truncated conical or any other suitable shape. The annular portion 14 has an axially extending portion 20 which is a close but sliding fit into the hole H in the subframe F. The axially extending portion 20 has an inner diameter 24 and a smaller outer diameter 22 than the outer diameter 18 of the annular portion 14. The axially extending portion 20 has an axial length 35 that extends the axial length L of the hole H in the subframe F. The bottom 15 of the annular portion 14 is placed adjacent the one side A of the subframe F. The axially extending tubular portion 28 is preferably elliptical in shape. Alternatively, the portion 28 may be round, parabolic with rounded ends or any other shape suitable for practicing the invention.

An insert 30 is disposed in the annular portion 14 and in the axially extending portion 20. The insert 30 has an outer diameter 32 and an inner peripheral shape 34. The peripheral shape 34 is preferably elliptical with a major diameter 36 and a minor diameter 38 which is similar to the shape of the annular axially extending layer 48.

The insert 30 has an annular flange portion 40 and an axially extending tube portion 42. Alternatively, the peripheral shape 34 may be parabolic with rounded ends or any other suitable shape that could be used in practicing the invention. The outer diameter 32 of the insert is larger than the outer diameter 22 of the axially extending portion 20. The tube portion 42 also has an axially extending length 45 which is normally the same as the length L' of the hole H in the subframe F for a purpose to be discussed later on. The thickness 44 of the tube portion 42 may vary radially. The thickness 44 is greatest adjacent to the axis of the minor diameter 38 which corresponds to the direction of the lateral mode L and thinnest near the axis of the major diameter 36 which corresponds to the fore and aft mode F & A. The insert 30 is disposed in the upper mount 12 such that it extends along the free end of the tube portion 42 but the flange portion 40 is disposed in the annular portion 14. Thus, there is a radial elastomeric layer portion 46 between the bottom surface 15 of the annular portion 14 and the bottom 41 of the flanged portion 40. Additionally, an annular axially extending elastomeric layer 48 is disposed against the elliptical inner peripheral shape 34 of the insert 30 and the tubular portion 28 of the thimble 26. The annular layer 48 has an elliptical shape.

If a stiffer response is required in the lateral L direction, a greater compressive force is imposed on the layer 48 by utilizing a thicker tubular member 28 having a larger outer periphery used in order to provide an additional

compressive force on the elastomer. As a result, the elastomeric response rate becomes stiffer. If the tubular member 28 is reduced in thickness, or has a smaller outer peripheral surface area, the compressive force on the elastomeric layer 48 is reduced and the response rate of the elastomer becomes softer.

The elliptical shape of the layer 48 in the lateral displacement mode L provides an increased amount of volume of elastomer than a prior art round shaped layer, to absorb radial forces in the lateral mode direction L. This has two effects: 1) the larger volume of elastomer provides the design engineer with another variable with which to tune the response of the mount to lateral displacement L to improve vehicle ride and handling characteristics; and 2) the larger volume of elastomer to absorb the lateral displacement forces to reduce stress in the elastomer. Thus, the elastomer has more area to absorb the force generated by the lateral displacement and as a result, the elastomer is exposed to a narrower range of material stress variations. Those skilled in the art will recognize that alternatively, the shape of the annular axially extending layer 48 and the tubular portion 28 of the thimble member and the peripheral shape 34 may be substantially parabolic in cross sectional area with rounded ends near the fore and aft, F & A, displacement mode or oblong in cross section or oval in cross sectional shape or any other non-circular shape suitable for practicing the invention.

The surface area of the tubular portion 28, in the lateral direction L, is preferably twice the surface area of the tubular portion 28 in the fore and aft direction F & A. Alternatively, the ratio of surface area in the lateral direction L to surface area in the fore and aft direction F & A ranges from 1.05 to 4.0. The response of the mount to lateral forces is greater than the response to fore and aft

forces, which is greater than the response to vertical forces. The vertical response ratio is lower or softer than the lateral or fore and aft response rates.

The elastomeric lower mount 60 includes a lower annular portion 62. The annular portion 62 has an inner diameter 66 and an outer diameter of 64. A flat flanged annular member 68 is adjacent to the lower radial surface 65 of the lower annular portion 62. The inner diameter 66 is slightly greater than the outer diameter 24 of the axially extending portion 20. The lower mount has an axial length 63 . The length 63 and the length 15 may be equal to each other. Optionally, the ratio of length 63 divided by length 15 may be greater than 1.0 or less than 1.0 depending on the vertical response rate desired.

A threaded fastener is inserted into the inner diameter 66 of the lower mount 60, through the inner diameter 16 of the tubular portion and a hole (not shown) in the body B. The head 72 of the threaded fastener 70 is adjacent to the flat flanged member 68 and the threaded portion 74 extends axially past the flanged portion 27 of the thimble 26. A threaded nut 76 engages the threaded portion 74 and the upper mount 10 and the lower mount 60 are clamped together to place a compressive axial load on the mounts 10, 60, respectively.

The upper isolator member 20 and the lower isolator member 60 are made of foamed elastomeric materials. Preferably, the members 20, 60, respectively, are made of a foamed microcellular polyurethane material (MCU) which can be compression molded, cast or injection molded or processed by means well known in the prior art. Alternatively, other foamed elastomers such as foamed fluorocarbon, foamed highly saturated nitrile, methyl acrylate acid polymer foam, silicone foam, EPDM foam, Neoprene® foam or the like and thermoplastic elastomers may be used in practicing the invention. Neoprene® is a registered trademark of DuPont.

Foamed microcellular polyurethane is a polymer product obtained from the interaction of the di-isocyanate glycol and a blowing agent. The glycol is usually a polyol which can be of either the polyester or polyether type. Both types generally have hydroxyl groups that are free to react with the di-isocyanate. The polyesters are low molecular weight macroglycols. The isocyanate reacts with water to produce carbon dioxide gas for foaming. Foam density is determined by the quantity of water present in the formulation and is characterized by the weight of the polyurethane material divided by the overall volume of the part. Once intimately mixed, the ingredients are discharged from a mixer and deposited into a mold where the complex chemical reactions take place to form the microcellular polyurethane.

The isocyanate also reacts with water to produce carbon dioxide gas for foaming. Foam density is determined by the quantity of water present in the formulation and is characterized by the weight of the polyurethane material divided by the overall volume. Once intimately mixed, the ingredients are discharged from the mixer and deposited into a mold where the complex chemical reactions take place.

The chemical reactions are primarily exo-thermic which converts the liquid into a foam. This technology is known in the prior art. See Rubber Technology, Third Edition, edited by Maurice Morton-Van Norstand Reinhold, ISBN 0-442-2642204, pages 555-560, which is incorporated by reference herein. The damping characteristics of a microcellular polyurethane foam are adjusted by the amount of gases trapped in the body of the polyurethane. Thus, the stiffness, and the vibration characteristics of the microcellular polyurethane can be adjusted by varying MCU density to meet specific application requirements. Microcellular polyurethane foam density varies from 0.3 to 0.8 grams per cubic centimeter. Preferably, the range of

density is 0.4 to 0.6 grams per cubic centimeter. The typical characteristics of MCU elastomers as compared to solid rubber are primarily influenced by the microcellular structure of the material and not by the chemical backbone or primary polymeric material. Due to the microcellular nature of the MCU material, polyurethane cells will collapse on top of each other under compressing load. This in turn will provide for a higher vertical stiffness and hence permits tuning of the ride characteristics in the vertical mode direction.

The annular portion 14 preferably has a foam density which is greater then the density of the lower annular portion 62. Preferably, the portion 14 and portion 62 are made of MCU material and portion 14 has a density which is 0.05 grams per cubic centimeter greater than the density of portion 62. Alternatively, the foam density of portion 62 can be the same as or greater than portion 14.

While the invention has been described in connection with a preferred embodiment, it will be understood that it is not intended to limit the invention to that embodiment only. On the contrary, it is intended to cover all alternative modifications and equivalents that may be included within the spirit and scope of the invention as defined by the appended claims.

WE CLAIM:

1. A vibration isolation mount for a motor vehicle with a body and a subframe, the body having an aperture, the subframe having a through hole, said isolation mount comprising:

a foamed elastomeric annular upper isolation member between the body and the subframe;

an annular insert member disposed in said annular upper isolation member and extending axially therefrom, said insert member having an elliptical inner axial passageway;

an elliptical isolation member extending from said upper isolation member and contiguous to said elliptical inner axial passageway of said annular insert member, said elliptical isolation member having a cross-sectional area and a passageway, said cross-sectional area having a major axis and a minor axis, said major axis providing attenuation for lateral vibration and said minor axis providing attenuation for fore and aft vibration;

an elliptical retainer member disposed in said passageway, said retainer member having a bore; and

a foamed elastomeric annular lower isolation member being mounted to the subframe opposite said annular upper isolation member, said annular lower isolation member and said annular upper isolation member providing attenuation for vertical vibration

2. A vibration isolation mount as claimed in Claim 1 wherein said elliptical isolation member further having a tubular lateral surface area and a tubular fore and aft surface area, said tubular lateral surface area is twice said tubular fore and aft surface area.

3. A vibration isolation mount as claimed in Claim 1 wherein said foamed elastomeric material is microcellular polyurethane.

4. A vibration isolation mount as claimed in Claim 1 wherein said foamed elastomeric material is selected from the group consisting of fluorocarbon, highly saturated nitrile, methyl acrylate polymer, silicone, EPDM, and Neoprene® and thermoplastic elastomer.

5. A vibration isolation mount as claimed in Claim 1 further comprising:

a threaded fastener disposed through the aperture, through said bore in said elliptical retainer member, through the hole in the subframe and through said annular lower isolation member; and

a threaded nut engaging said threaded fastener.

6. A vibration isolation mount as claimed in Claim 2 wherein said lateral attenuation is less than the fore and aft attenuation.

7. A vibration isolation mount as claimed in Claim 3 wherein said microcellular polyurethane having a density varying from 0.3 to 0.8 grams per cubic centimeter.

8. A vibration isolation mount as claimed in Claim 5 wherein said threaded nut being engaged to said threaded fastener to place compressive axial load on said upper isolation member and said lower isolation member.

9. A vibration isolation mount as claimed in Claim 8 wherein said compressive axial load affecting the vertical attenuation.

10. A vibration isolation mount as claimed in Claim 9 wherein said compressive axial load affecting the lateral and fore and aft attenuation.

11. An isolation mount for use in motor vehicles with a body and a subframe, the subframe having a through hole, said isolation mount comprising:

a foamed elastomeric upper isolation member having an annular top portion and an arcuate annular portion extending axially from said top portion, said arcuate annular portion having a cross section and an inner arcuate axial passage, said inner axial passage having an arcuate passageway;

an annular insert member disposed axially in said top portion, said insert member having an arcuate inner axial surface contiguous to said arcuate annular portion of said upper isolation member;

a retainer member disposed in said inner axial passageway, said retainer member having a bore; and

a foamed elastomeric lower isolation member adjacent to said retainer member;

whereby said upper isolation member and said lower isolation member attenuating vertical vibration forces and said arcuate annular portion and said arcuate retainer member attenuating lateral vibration forces and fore and aft vibration forces.

12. An isolation mount as claimed in Claim 11 wherein said arcuate inner axial surface is elliptical in cross-sectional area.

13. An isolation mount as claimed in Claim 11 wherein said arcuate inner axial surface is parabolic in cross-sectional area.

14. An isolation mount as claimed in Claim 11 wherein said arcuate inner axial surface is oval in cross-sectional area.

15. An isolation mount as claimed in Claim 11 wherein said foamed elastomeric upper isolation member is a microcellular polyurethane.

16. An isolation mount as claimed in Claim 11 wherein said foamed elastomeric upper isolation member is a material selected from the group of fluorocarbon, highly saturated nitrile, EPDM, silicone, methyl acrylate acid and Neoprene® polymer.

17. An isolation mount as claimed in Claim 14 wherein said arcuate inner axial surface has a major diameter and a minor diameter, the ratio of said major diameter divided by said minor diameter varies between 1.05 to 4.0.

18. An isolation mount as claimed in Claim 11 wherein said inner axial surface forming a compressive radial load on said arcuate annular portion to affect the lateral isolation response of said mount.

19. An isolation mount as claimed in Claim 11 further comprising a threaded member disposed in said inner axial passageway, said threaded member being engaged by a threaded nut to form a compressive axial load on said upper member and said lower member to affect the vertical isolation response of said mount.

20. An isolation mount as claimed in Claim 11 wherein said foamed elastomeric upper isolation member is a material selected from the group of fluorocarbon, highly saturated nitrile, EPDM, silicone, methyl acrylate polymer and Neoprene® polymer.

ABSTRACT

An isolation mount for use in motor vehicles in which the mount is sandwiched between the subframe and body. The mount includes an elastomeric upper mount and lower mount and a threaded fastener drawing the two elastomeric mounts together. The upper mount has an insert member with an oblong shape in the lateral displacement direction of the vehicle. The oblong shape increases the volume of elastomer that can be used to respond to lateral forces and reduces the stresses developed on the elastomer. The lateral response rate is stiffer than the fore and aft response rate and both are stiffer than the vertical response rate.

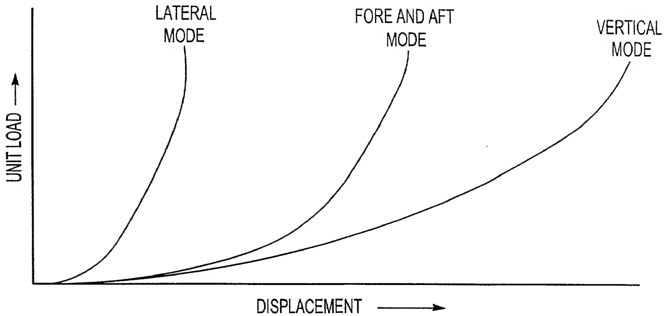
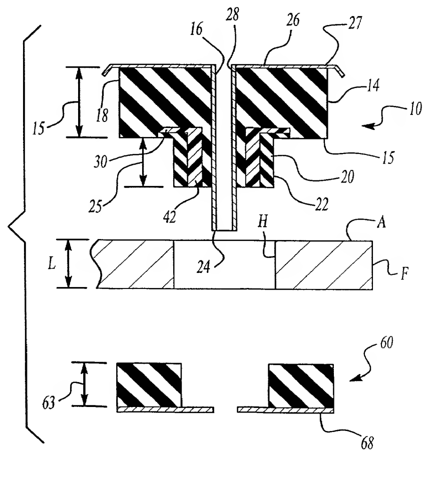

LATERAL MODE
FORE AND AFT MODE
VERTICAL MODE
UNIT LOAD
DISPLACEMENT

Fig-1

Fig-3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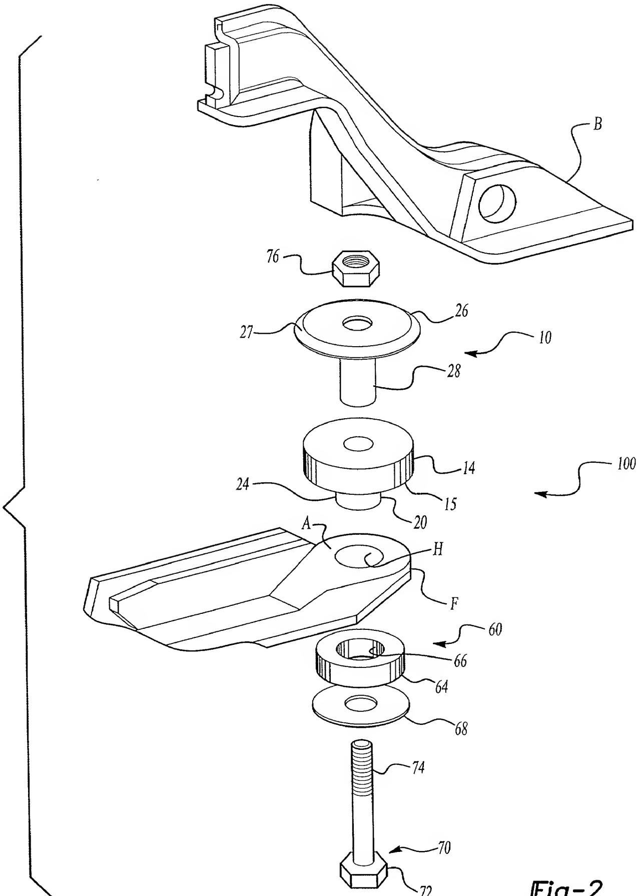

Fig-2

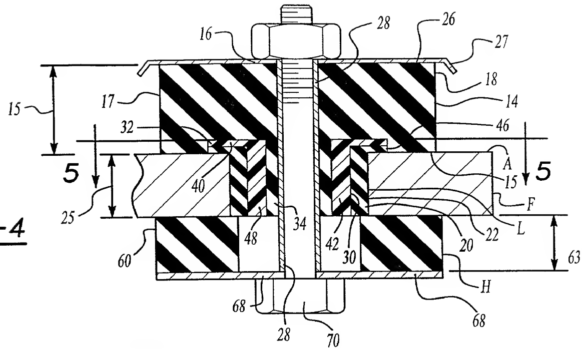

Fig-4

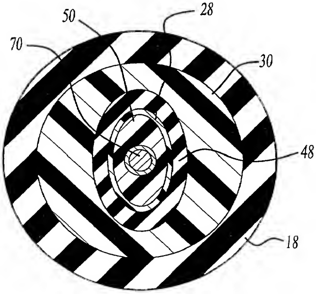

Fig-5

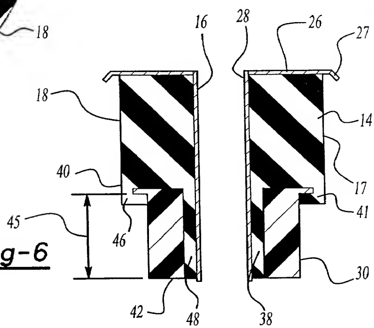

Fig-6

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am an original, first and joint inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Isolation Mount

the specification of which is attached hereto.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application or to the patentability of the invention claimed therein in accordance with Title 37, Code of Federal Regulations, section 1.56.

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States Provisional application(s) listed below:

PRIOR PROVISIONAL APPLICATION(S)

(Application serial number)	(Month/Day/Year Filed)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint Casimir R. Kiczek, Reg. No.28,865, and each principal, attorney of counsel, associate and employee of Harness, Dickey & Pierce, P.L.C., who is a registered Patent Attorney, my attorney with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. I request the Patent and Trademark Office to direct all correspondence and telephone calls relative to this application to Harness, Dickey & Pierce, P.L.C., P. O. Box 828, Bloomfield Hills, Michigan 48303 (734) 662-8000.

Full name of sole or first inventor: Shahram Tousi

Inventor's signature: Shahram Tousi

Date: 04/20/2000

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DECLARATION AND POWER OF ATTORNEY

Full name of second joint inventor: Ulrich Bressler

Second Inventor's signature: Ulrich Bressler

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Full name of third joint inventor, if any: Casimir R. Kiczek

Third Inventor's signature: Casimir R Kiczek

Date: APRIL 20, 2000

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